

Line 20, delete "is available to that of  
the above invention.";

Line 24, insert --accordance with-- after  
"in";

PAGE 29:

Line 3, change "is reduced in" to  
--lower--;

Line 4, change "stabilized in" to --a more  
stabilized--;

Line 7, change "reduction of" to --a  
reduction in the--;

Line 13, change "decrease in externally  
leaking amount of" to --a decrease in  
externally lost-;

Line 19, change "leaks to an outside" to  
--is lost--.

IN THE CLAIMS:

Kindly amend claims 1-9 by rewriting them in amended  
form as follows:

1. (Amended) [A] An ultrasonic motor, comprising:  
a piezoelectric vibrator for undergoing oscillating [due]  
movement in response to an input drive signal and for  
generating a drive force; and a support member for supporting

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B1) the piezoelectric vibrator on a substrate[; wherein], the support member [has] having a signal transmission function to transmit the drive signal to the piezoelectric vibrator.

2. (Amended) [A] An ultrasonic motor according to claim 1; [,] wherein the support member has sufficient elasticity[, and] to elastically urge the piezoelectric vibrator [being press-contacted with] against a moving member to drive the moving member in response to oscillating movement of the piezoelectric vibrator [by an elastic force of the support member].

3. (Amended) [A] An ultrasonic motor according to claim 1; [,] wherein the support member has a constriction portion that is [made thin] thinner than a connection portion connected to the piezoelectric vibrator.

4. (Amended) [A] An ultrasonic motor according to claim 1; [,] wherein the support member [is a] comprises part of the substrate.

5. (Amended) [A] An ultrasonic motor according to claim 4; [,] wherein the substrate has a recess portion for receiving the piezoelectric vibrator [is provided in a recess formed in the substrate].

6. (Amended) [A] An ultrasonic motor according to claim 4; [,] wherein the piezoelectric vibrator is mounted on the support member.

7. (Amended) [A] An ultrasonic motor according to claim 1; [,] wherein the support member is provided with at least [one] a part of a drive circuit for producing the drive signal.

8. (Amended) [A] An ultrasonic motor according to claim 1; [,] wherein the support member supports the piezoelectric vibrator at a point corresponding to a node of vibration [caused thereon] to reduce vibration loss.

9. (Amended) An electronic appliance having [a] an ultrasonic motor according to claim 1.

Kindly add the following new claims 10-21:

10. An ultrasonic motor, comprising: a substrate; a piezoelectric vibrator disposed on the substrate to undergo vibration in response to a drive signal; a support member for supporting the piezoelectric vibrator on the substrate, the support member being effective to transmit the drive signal to the piezoelectric vibrator; and a movable member disposed on the substrate in contact with the piezoelectric vibrator and driven in response to vibration of the piezoelectric vibrator.

11. An ultrasonic motor according to claim 10;  
wherein the support member has a set of signal lines fixed  
thereto for transmitting the drive signal to the piezoelectric  
vibrator.

12. An ultrasonic motor according to claim 10;  
wherein the support member has sufficient elasticity to  
elastically urge the piezoelectric vibrator against the  
movable member.

13. An ultrasonic motor according to claim 10;  
wherein the support member has a relatively thinner  
constriction portion and a relatively thicker connection  
portion, the constriction portion being effective for  
decreasing vibration losses.

14. An ultrasonic motor according to claim 10;  
wherein the support member comprises part of the substrate.

15. An ultrasonic motor according to claim 14;  
wherein the substrate has a recess portion in which is  
disposed the piezoelectric vibrator.

16. An ultrasonic motor according to claim 10;  
wherein the support member includes thereon at least a part of  
a drive circuit for producing the drive signal.

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cm 4

17. An ultrasonic motor according to claim 10; wherein the support member is positioned to support the piezoelectric vibrator at a vibration node of the piezoelectric vibrator to thereby reduce vibrational loss.

18. An ultrasonic motor according to claim 10; wherein the support member comprises two support member pieces disposed on opposite sides of the piezoelectric vibrator for supporting the piezoelectric vibrator.

19. An ultrasonic motor according to claim 18; wherein each of the support member pieces has a set of signal lines fixed thereto for transmitting the drive signal to the piezoelectric vibrator.

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20. An electronic appliance incorporating an ultrasonic motor, comprising: an ultrasonic motor comprising a substrate, a piezoelectric vibrator disposed on the substrate to undergo vibration in response to a drive signal, a support member for supporting the piezoelectric vibrator on the substrate, the support member being effective to transmit the drive signal to the piezoelectric vibrator, and a movable member disposed on the substrate in contact with the piezoelectric vibrator and driven to undergo movement in response to vibration of the piezoelectric vibrator; an output mechanism for outputting a motion; and a transmission

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mechanism for transmitting movement of the movable member to the output mechanism.

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21. An appliance according to claim 20; wherein the output mechanism comprises one of an electronic timepiece, a measuring instrument, a camera, a printer, a printing machine, a machine tool, a robot, a moving apparatus and a memory device.

IN THE ABSTRACT:

Delete the original abstract of record and insert therefor the new abstract submitted herewith on a separate sheet.

ADDITIONAL FEES:

A check in the amount \$18 is enclosed to cover the cost of one claim in excess of 20 total claims. Should it be determined that a fee is due, authorization is hereby given to charge any such fee to our Deposit Account No. 01-0268.

REMARKS

In order to place this application in better condition for a complete action on the merits, the specification has been amended in editorial respects to correct various informalities and to improve the wording. No

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impermissible new matter has been added. A new, more descriptive abstract has been submitted to replace the original abstract. Claims 1-9 have been amended in form respects to improve the wording and to place them in better conformance with U.S. practice. To provide a fuller scope of coverage, new claims 10-21 have been added.

As described in the specification, the present invention pertains to an ultrasonic motor constructed so as to have improved driving force, reduced vibrational loss and smaller dimensions as compared with the conventional art.

One embodiment of the inventive ultrasonic motor is illustrated in Figure 1. The inventive ultrasonic motor includes a substrate. A piezoelectric vibrator 10 generates a vibrational driving force in response to a received drive signal. The drive signal is transmitted along leads 7 to a support member 11. The support member 11 supports, and is in electrical connection with, the piezoelectric vibrator 10 on the substrate 8. Thus, the support member is effective for both supporting the piezoelectric member 10 and for transmitting the drive signal to the piezoelectric vibrator 10. A movable member 12 contacts the piezoelectric vibrator 10 and moves in response to the vibrational driving force.

In accordance with an embodiment of the inventive ultrasonic motor, the support member is comprised of an elastic material effective to elastically urge the piezoelectric vibrator against the movable member. The support member may include a relatively thinner constriction portion and a relatively thicker connection portion, the constriction portion being effective for decreasing vibration losses. The support member may also be incorporated as part of the substrate, wherein the substrate has a recess portion in which the piezoelectric vibrator is disposed to reduce the overall thickness of the motor. To further reduce the overall dimensions of the inventive ultrasonic motor, the electrically conductive support member may be part of a drive circuit for producing the drive signal. Also, the support member may be configured for supporting the piezoelectric vibrator at a flex vibration node of the piezoelectric vibrator to reduce vibrational loss.

Thus, in accordance with the present invention an improved ultrasonic motor is provided having reduced vibrational loss, smaller dimensions and improved driving force as compared with the conventional art. The inventive ultrasonic motor may be incorporated in an electronic appliance, such as an electronic timepiece, a measuring





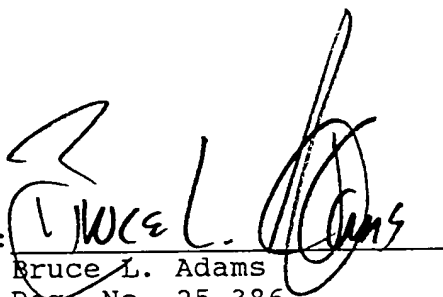
instrument, a camera, a printer, a printing machine, a machine tool, a robot, a moving apparatus and a memory device.

Early and favorable action on the merits are most respectfully requested.

Respectfully submitted,

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MAILING CERTIFICATE

I hereby certify that this correspondence is being deposited with the United States Postal Service as first-class mail in an envelope addressed to: Commissioner of Patents & Trademarks, Washington, D.C. 20531, on the date indicated below.

  
Bruce L. Adams

Attorney Name

Signature

April 4, 2000

Date

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KINDLY ACKNOWLEDGE RECEIPT OF THE  
BELOW-LISTED MATERIAL, AND RETURN

PRELIMINARY AMENDMENT (WITH MAILING CERTIFICATE),  
ABSTRACT OF THE DISCLOSURE and CHECK IN THE  
AMOUNT OF \$18.00

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